

Message Text

UNCLASSIFIED

PAGE 01 STATE 084347

51

ORIGIN OES-05

INFO OCT-01 EUR-12 ISO-00 /018 R

DRAFTED BY OES:HDBRUNER
APPROVED BY OES:HDBRUNER
EUR/NE:PFCANNEY (INFO)

----- 001841

P 141552Z APR 75
FM SECSTATE WASHDC
TO AMEMBASSY HELSINKI PRIORITY

UNCLAS STATE 084347

E.O. 11652: N/A
TAGS: OVIP, TGEN, FI
PLS. PASS TO DR. DIXY LEE RAY, ASST. SECRETARY, HOUSE GUEST
OF AMB. AND MRS. AUSTAD

1. USAEC RESPONSE TO HOT PARTICLE PROBLEM PUBLISHED SEPT.
1974 AS WASH-1320, "A RADIOBIOLOGICAL ASSESSMENT OF THE
SPATIAL DISTRIBUTION OF RADIATION DOSE FROM INHALED
PLUTONIUM". SUMMARY OF TEXT FOLLOWS:

QUOTE 1. RECOGNITION OF THE IMPORTANCE OF SPATIAL DISTRI-
BUTION OF DOSE TO RADIATION PROTECTION PRACTICES BY
NATIONAL AND INTERNATIONAL STANDARDS SETTING ORGANIZATIONS
AND THE SCIENTIFIC COMMUNITY PREDATES THE DISCOVERY OF
PLUTONIUM. CONTINUED EXAMINATION OF THE RADIOBIOLOGICAL
ASPECTS OF THE SPATIAL DISTRIBUTION OF DOSE, ESPECIALLY
AS REGARDS ALPHA-EMITTING PARTICLES, HAS NOT LED TO
MAJOR CHANGES IN RADIATION PROTECTION STANDARDS. HOW-
EVER, THE PROBLEM IS AND SHOULD BE CONTINUALLY REASSESSED.

2. EXPERIMENTAL ANIMAL STUDIES CLEARLY INDICATE
THAT INHALED RADIOACTIVE PARTICLES MOVE FROM THE LUNG TO
OTHER ORGANS AND MAY BE EXCRETED FROM THE BODY BY SEVERAL
MECHANISMS. THE EXPERIMENTAL DATA ALSO SHOW THAT TLY
UNIFORM DISTRIBUTIONS OF INHALED RADIONUCLIDES IN LUNG
SELDOM, IF EVER, OCCUR. HOWEVER, BECAUSE OF THE MOBILITY
UNCLASSIFIED

UNCLASSIFIED

PAGE 02 STATE 084347

OF PLUTONIUM WITHIN LUNG, THERE IS SOME BIOLOGICAL

JUSTIFICATION FOR AVERAGING THE RADIATION DOSE TO THE TOTAL TISSUE.

3. ALTHOUGH PARTICLES DEPOSITED IN LUNG ARE DYNAMIC AND MOBILE UNLESS TRAPPED, I.E., IN SCAR TISSUE, EXPERIMENTS HAVE SIMULATED THE STATIC PLUTONIUM PARTICLE TO STUDY THE BIOLOGICAL EFFECTS OF TRULY 'HOT SPOTS' OF RADIOACTIVITY IN LUNG. THESE AND OTHER COMPARATIVE EXPERIMENTS OF UNIFORM AND NONUNIFORM DISTRIBUTIONS OF ABSORBED ENERGY FROM RADIOACTIVE PARTICLES SUGGEST A BIOLOGICAL SPARING EFFECT FOR BOTH ACUTE AND LATE RESPONSES TO THE NONUNIFORM DISTRIBUTION. AVAILABLE EXPERIMENTAL DATA INDICATE THAT AVERAGING THE ABSORBED ALPHA RADIATION DOSE FROM PLUTONIUM PARTICLES IN LUNG IS RADIOBIOLOGICALLY SOUND.

4. DOSIMETRIC MODELS USED TO PREDICT LUNG TUMOR PROBABILITY IN ANIMALS AND IN HUMAN BEINGS ARE BIOLOGICALLY DEFICIENT, PRIMARILY BECAUSE OF THE LACK OF THE REQUIRED BIOLOGICAL INFORMATION. ALSO, MOST MODELS ARE BASED ON STUDIES OF TUMOR INDUCTION IN IRRADIATED RAT SKIN AND ON THE ASSUMED VALIDITY OF EXTRAPOLATING TO LUNG TISSUE. THIS PRACTICE IS QUESTIONABLE FOR SEVERAL REASONS INCLUDING THE FACT THAT THE RESULTS OF STUDIES WITH RATS, I.E., TUMOR TYPE, VARY WITH RAT STRAINS AND THAT THE RESULTS OF COMPARABLE STUDIES OF IRRADIATED MOUSE SKIN HAVE NOT GIVEN RESULTS IDENTICAL TO THE RAT EXPERIMENTS. THUS, USE OF THESE MODELS CAN LEAD TO ERRONEOUS PREDICTIONS OF TUMOR PROBABILITIES.

5. CONSIDERATION OF MECHANISMS OF RADIATION CARCINOGENESIS SUGGESTS THAT THERE HAS BEEN NO CHANGE IN DIRECTION OR STRENGTH OF DATA WHICH WOULD COMPEL DEPARTURE FROM THE CONCEPT THAT AVERAGE LUNG DOSE FOR ALPHA PARTICLES PROVIDES A REASONABLE AND CONSERVATIVE BASE FOR PROTECTION.

6. AFTER THIRTY YEARS EXPERIENCE WITH PLUTONIUM IN LABORATORY AND PRODUCTION FACILITIES, THERE IS NO UNCLASSIFIED

UNCLASSIFIED

PAGE 03 STATE 084347

EVIDENCE THAT THE MEAN DOSE LUNG MODEL ON WHICH OCCUPATIONAL RADIATION PROTECTION STANDARDS FOR PLUTONIUM ARE BASED IS GROSSLY IN ERROR OR LEADS TO HAZARDOUS PRACTICES. CURRENTLY AVAILABLE DATA FROM OCCUPATIONALLY EXPOSED PERSONS INDICATE THAT THE NON-HOMOGENEOUS DOSE DISTRIBUTION FROM INHALED PLUTONIUM DOES NOT RESULT IN DEMONSTRABLY GREATER RISK THAN THAT ASSUMED FOR A UNIFORM DOSE DISTRIBUTION. THUS, EMPIRICAL CONSIDERA-

TIONS LEAD TO THE CONCLUSION THAT THE NONUNIFORM DOSE
DISTRIBUTION OF PLUTONIUM PARTICLES IN THE LUNG IS NOT

- -

MORE HAZARDOUS AND MAY BE LESS HAZARDOUS THAN IF THE
PLUTONIUM WERE UNIFORMLY DISTRIBUTED AND THAT THE MEAN
DOSE LUNG MODEL IS A RADIOBIOLOGICALLY SOUND BASIS FOR
ESTABLISHMENT OF PLUTONIUM STANDARDS. UNQUOTE

2. 142 REFERENCES.

KISSINGER

UNCLASSIFIED

NNN

Message Attributes

Automatic Decaptioning: X
Capture Date: 01 JAN 1994
Channel Indicators: n/a
Current Classification: UNCLASSIFIED
Concepts: PLUTONIUM, NUCLEAR HAZARDS
Control Number: n/a
Copy: SINGLE
Draft Date: 14 APR 1975
Decaption Date: 01 JAN 1960
Decaption Note:
Disposition Action: n/a
Disposition Approved on Date:
Disposition Authority: n/a
Disposition Case Number: n/a
Disposition Comment:
Disposition Date: 01 JAN 1960
Disposition Event:
Disposition History: n/a
Disposition Reason:
Disposition Remarks:
Document Number: 1975STATE084347
Document Source: CORE
Document Unique ID: 00
Drafter: HDBRUNER
Enclosure: n/a
Executive Order: N/A
Errors: N/A
Film Number: D750129-0767
From: STATE
Handling Restrictions: n/a
Image Path:
ISecure: 1
Legacy Key: link1975/newtext/t19750452/aaaabwky.tel
Line Count: 125
Locator: TEXT ON-LINE, ON MICROFILM
Office: ORIGIN OES
Original Classification: UNCLASSIFIED
Original Handling Restrictions: n/a
Original Previous Classification: n/a
Original Previous Handling Restrictions: n/a
Page Count: 3
Previous Channel Indicators: n/a
Previous Classification: n/a
Previous Handling Restrictions: n/a
Reference: n/a
Review Action: RELEASED, APPROVED
Review Authority: ShawDG
Review Comment: n/a
Review Content Flags:
Review Date: 01 JUL 2003
Review Event:
Review Exemptions: n/a
Review History: RELEASED <01 JUL 2003 by maginmm>; APPROVED <22 JAN 2004 by ShawDG>
Review Markings:

Margaret P. Grafeld
Declassified/Released
US Department of State
EO Systematic Review
05 JUL 2006

Review Media Identifier:
Review Referrals: n/a
Review Release Date: n/a
Review Release Event: n/a
Review Transfer Date:
Review Withdrawn Fields: n/a
Secure: OPEN
Status: NATIVE
Subject: n/a
TAGS: OVIP, TGEN, FI
To: HELSINKI
Type: TE
Markings: Margaret P. Grafeld Declassified/Released US Department of State EO Systematic Review 05 JUL 2006